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AVOIDING TRACHEOSTOMY COMPLICATION

To the Editor:

I enjoyed the recent article, "'Corkscrew stenosis': Defining and preventing a complication of percutaneous dilatational tracheostomy," by Jacobs and colleagues[1] in the February issue of *The Journal of Thoracic and Cardiovascular Surgery*.

We have performed percutaneous tracheostomy for longer than 10 years at our Medical Center. We have not seen an increase in postpercutaneous tracheal stenosis, and have not performed a tracheal resection for this complication. When performing percutaneous tracheostomy, we attempt to place the tracheostomy lower on the anterior wall of the trachea (ie, just below the thyroid isthmus) to avoid the isthmus and subsequent bleeding into the tracheobronchial tree.

If the tracheostomy with dilator does not pass easily into the trachea, we dissect the subcutaneous tissue and/or dilate the tracheal opening with a standard tracheal dilator or clamp. These steps usually allow easy passage of the tracheostomy.

We instruct our bronchoscopist, usually the anesthesiologist, to pull back the endotracheal tube so that we enter the trachea without impaling the endotracheal tube. Under these circumstances, the endotracheal tube is just proximal in the airway to where the tracheostomy is being inserted. When the endotracheal tube is positioned just proximal to the tracheostomy insertion site, anterior tracheal ring fracture is prevented (as described by the authors).

We agree with the authors that the positioning of the supportive endotracheal tube is important in preventing anterior tracheal ring fracture. We also believe that placing the tracheostomy just inferior to the thyroid isthmus, which may serve as a cushion for the anterior tracheal ring, and dilating the skin incision or tracheal opening itself have prevented us from experiencing this complication.

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Reply to the Editor:

We greatly appreciated the thoughtful review of our article provided by Dr Baciewicz. Furthermore, the suggestions offered by Dr Baciewicz are of great interest and work well at his center, where he has not seen "corkscrew" tracheal stenosis after percutaneous dilatational tracheostomy (PDT) in the same way that we have been receiving them at our referral center.

We agree that adequate dissection of soft tissue anterior to the trachea is critical in avoiding excessive force and torque when advancing the dilator, which can lead to tracheal ring fractures, as described. Because this is a minimally invasive means of providing a tracheostomy, there is often a tendency to make the skin incision as small as possible. This should be avoided. An incision large enough to accommodate the dilator and then the tracheostomy without great resistance should be made (at least 1.5-2 cm). Furthermore, using a clamp to dissect and spread the soft tissue anterior to the trachea is similarly important and done routinely at our institution.

Dr Baciewicz also describes dilating the actual trachea with a tracheal dilator or clamp when there is difficulty passing the tracheostomy with the dilator. This was first described during the percutaneous technique by Griggs and colleagues[1] in 1990 using guidewire dilating forceps. Since then, this technique has been compared with the single-step curved dilator technique in multiple small randomized studies, most of which found the 2 techniques similar.[2-4] We use the Griggs technique in a few of our cases (3%) when we encounter a trachea that is particularly difficult to dilate. These tenacious tracheas are most often encountered in young patients, and we agree that the Griggs technique is an important maneuver that should be in the armamentarium of those performing PDTs.

We appreciate the comments provided regarding the location of placement along the trachea. Dr Baciewicz recommends placing the tracheostomy lower along the anterior tracheal wall just inferior to the thyroid isthmus. We agree with the "low" placement of the tracheostomy to a certain extent. The tracheostomy placement should be low enough that it does not risk injuring the cricoid

cartilage, an injury that can be difficult to manage should it later become symptomatic. However, we believe that if placement of the tracheostomy is too low, the dilator will enter the trachea at an oblique, rather than perpendicular, orientation, which increases the risk of tracheal ring fracture, as described. The ideal location of entry lies between the second and third tracheal rings, which can be precisely discerned using bronchoscopic guidance. It is unclear how the location of the thyroid isthmus can be reliably determined using a percutaneous technique, and bronchoscopic guidance should be routinely used to accurately determine the insertion site.

The PDT remains an excellent option for many patients requiring long-term mechanical ventilation. The continued discussion of the important technical aspects of the PDT is critical for the avoidance of its potential complications, such as corkscrew stenosis.

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CLAMP TIMES, TEACHING, AND TECHNICAL EXCELLENCE

To the Editor:

ElBardissi and colleagues[1] analyze the role of team learning curves in outcomes of coronary artery bypass surgery, concluding that the experience of the attending surgeon plays a much less important role in the speed of surgery than the number of times an attending and fellow have operated together as a team. The authors' thought-provoking analysis merits several comments.

In a teaching program with 73 fellows and 11 experienced attending surgeons, the average number of times a particular team operated together across a decade and more than 4000 cases was 10; perhaps this contributes to the finding that experience together was a much stronger predictor of the speed of surgery than time as an attending surgeon. In addition, if fellows performed most cases as the primary surgeons, the attendings' experience would be even less likely to emerge as a dominant factor in operative speed.

The authors' choice of operative speed as the primary end point, rather than clinical outcomes, is an interesting one. How did the authors account for variation in anatomy, technique, or other personnel? A further challenge presented by speed as a primary outcome is that either extreme may be associated with worse clinical performance: in a cumulative sum analysis of 8 surgeons' learning curves for coronary bypass grafting, a causal association was observed between unacceptable mortality and morbidity rates and the quickest surgeon in a cohort.[2] ElBardissi and colleagues[1] conclude that the lack of correlation between attending experience and speed shows that attendings "fail to make significant improvements over the course of their career." Is it not more likely that these attending surgeons continued to become even more proficient with time—teaching more and achieving excellent technical and clinical outcomes more often, despite increasingly challenging cases?

We agree with the authors that greater team experience contributes to excellent patient outcomes and resident education. We suspect this is particularly true for residents in the 6-year integrated residency programs: these trainees perform selected cases as the primary surgeon during their first and second year out of medical school most safely and successfully if they have already built up solid operative experience with the specific attending surgeons. An analysis using a similar method to that of ElBardissi and colleagues,[1] using adverse clinical events as end points, like the accompanying article in the same issue[3] or the study by Holzney and colleagues,[2] could provide valuable lessons for clinical practice and surgical education in this era of increasingly streamlined training.

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